

WHAT IS CLAIMED IS:

1. A plasma processing method for etching a sample having a gate oxide film, comprising the steps of:
 - generating a plasma in a vacuum chamber using electromagnetic waves;
 - applying an rf bias power to the sample;
 - turning off the rf bias power before a charged voltage of the sample reaches a breakdown voltage of the gate oxide film;
 - turning on the rf bias power after the charged voltage of the sample has substantially dropped; and
 - repeating the turning on and off of the rf bias power to process the sample;wherein the off-time is set at least longer than the on-time, and the plasma is generated by continuously supplying power to enable generation of the plasma during the repeated turning on and off of the rf bias power.
2. A plasma processing method according to claim 1, wherein the off-time is set at a value which is at least twice the on-time.
3. A plasma processing method according to claim 1, wherein the on-time of the rf bias power to be applied to the sample is set at no greater than 60 to 120 μ s.
4. A plasma processing method according to claim 2, wherein the on-time of the rf bias power to be applied to the sample is set at no greater than 30 to 60 μ s.